

## CLAIMS

I claim:

1. An apparatus for transitioning between fluid power and torque using a fluid flow, said apparatus comprising:

at least one piston sleeve, a drive shaft, a housing, inlet passageways, outlet passageways, and a valve system;

said piston sleeves and said valve system intermediate and operatively connected to said drive shaft and said housing, each said piston sleeve having opposing ends;

a first interface between said drive shaft and each said piston sleeve and a second interface between said housing and each said piston sleeve, said first interface and said second interface being each a different one of either of a linear interface and a combination interface such that linear motion in said piston sleeve results in rotation of said drive shaft relative to said housing;

said inlet passageways and said outlet passageways capable of supporting portions of said fluid flow; and

said valve system operative to coordinate intermittent flow of said portions of said fluid flow within each of said inlet passageway and each said outlet passageway such that said inlet passageways and said outlet passageways become alternately accessible to said opposing ends of each said piston sleeve.

2. The apparatus of claim 1, further comprising:

said linear interface having a linear roller set and a linear pair of opposing raceways;  
and

said combination interface having a combination roller set and a combination pair of opposing raceways, said combination pair of opposing raceways comprising a fixed point raceway and a circumferential raceway having radiuses and ramps.

3. The apparatus of claim 2, further comprising:

a configuration of said circumferential raceway having radiuses and ramps determinative of said apparatus' operational performance.

4. The apparatus of claim 1, further comprising:

one of said drive shaft and said housing attachable to a pressurize fluid supply and the other attachable to a rotary tool.

5. The apparatus of claim 1, further comprising:

one of said drive shaft and said housing attachable to a rotary power supply and the other in fluid communication with a fluid supply.

6. The apparatus of claim 1, further comprising:

said drive shaft having an interior for supporting fluid flow;

7. A fluid motor for manipulating a fluid, said motor comprising:

a housing, said housing having an exterior surface, and an axial hollow interior core;

at least one piston sleeve, said piston sleeves generally cylindrical in shape, having an exterior surface and an axial hollow interior core, each said piston sleeve coaxially positioned

within said hollow interior core of said housing, each said piston sleeve having opposing piston crowns;

a drive shaft, said drive shaft generally cylindrical in shape, having an exterior surface and an axial hollow interior core capable of supporting a fluid flow, said drive shaft coaxially positioned within said hollow interior core of said piston sleeve;

each said piston sleeve capable of both lateral and rotational motion, said lateral and rotational motion of said piston sleeve directly related, said piston sleeve operatively connected to said drive shaft and said housing such that one of said drive shaft and said housing rotates with said piston sleeve in relation to the other of said drive shaft and said housing;

said inlet and outlet passages, each capable of supporting portions of said fluid flow to coordinately provide fluid communication to and from each of said piston crowns; and

a valve system operatively connected with each of said piston sleeves, said drive shaft, said housing, said inlet flow passages and said outlet flow passages to coordinate alternately sequenced fluid communication of said portions of said fluid flow to and from each of said piston crowns.

8. The fluid motor of claim 7 further comprising:

said inlet and outlet passages, each capable of alternately providing fluid communication to and from each of said piston crowns.

9. The fluid motor of claim 7 further comprising:

complimentingly different corresponding pairs of raceways being an outside interface raceway pair and an inside interface raceway pair;

said outside interface raceway pair comprising a raceway on said axial hollow interior core of said housing and said exterior surface of said sleeve piston;

said inside interface raceway pair comprising a raceway on said axial hollow interior core of said sleeve piston and said exterior surface of said drive shaft; and

two interface pairs comprising said piston sleeve and said housing, and said drive shaft and said piston sleeve;

each of said outside interface raceway pair and said inside interface raceway pair adapted to either of permitting lateral motion while prohibiting rotational motion and permitting lateral motion directly related to rotational motion, between respective said interface pair.

10. The device of claim 9 further comprising:

a first said complimentingly different corresponding pair of raceways comprising a fixed point raceway and a circumferential raceway having radiuses and ramps; and

a second said complimentingly different corresponding pair of raceways comprising at least one linear raceway.

11. The apparatus of claim 7, further comprising:

one of said drive shaft and said housing attachable to a pressurize fluid supply and the other attachable to a rotary tool.

12. The apparatus of claim 7, further comprising:

one of said drive shaft and said housing attachable to a rotary power supply and the other in fluid communication with a fluid supply.

13. An apparatus for transitioning between fluid power and torque using a fluid flow, said apparatus comprising:

at least one piston sleeve, a drive shaft, a housing, inlet passageways, outlet passageways, and a means for valving said inlet and outlet passageways;

said piston sleeves and said valve system intermediate and operatively connected to said drive shaft and said housing;

a means for interfacing said piston sleeves with said drive shaft and said housing, said interfacing means providing a direct relationship between linear motion in said piston sleeves and rotation of said drive shaft relative to said housing;

said inlet passageways and said outlet passageways capable of supporting portions of said fluid flow; and

said valving means operative to coordinate intermittent flow of said portions of said fluid flow within each of said inlet and said outlet passageways such that said inlet passageways and said outlet passageways become alternately accessible to opposing ends of each said piston sleeve.

14. The device of claim 13 wherein said interfacing means further comprising:  
complimentingly different corresponding pairs of raceways being an outside interface raceway pair and an inside interface raceway pair;  
said outside interface raceway pair comprising a raceway on said axial hollow interior core of said housing and said exterior surface of said piston sleeve;  
said inside interface raceway pair comprising a raceway on said axial hollow interior core of said piston sleeve and said exterior surface of said drive shaft; and  
two interface pairs comprising said piston sleeve and said housing, and said drive shaft and said piston sleeve;  
each of said outside interface raceway pair and said inside interface raceway pair adapted to either of permitting lateral motion while prohibiting rotational motion and permitting lateral motion directly related to rotational motion, between respective said interface pair.

15. The device of claim 14 further comprising:  
a first said complimentingly different corresponding pair of raceways comprising a fixed point raceway and a circumferential raceway having radiuses and ramps; and  
a second said complimentingly different corresponding pair of raceways comprising at least one linear raceway.

16. The device of claim 13 further comprising:  
said valving means for directing said fluid flow to said piston sleeve opposing crowns being a valve system at each said opposing end of each said piston sleeve.

17. A method for transitioning between fluid power and torque comprising:
- applying pressure to at least one piston sleeve to induce both lateral and rotational motion in each said piston sleeve, each of said piston sleeves operatively connected to a drive shaft and a housing such that one of said drive shaft and said housing rotates with each said piston sleeve in relation to the other of said drive shaft and said housing.
18. Said method of claim 17, further comprising:
- coordinating the application of pressure step with a valve system operatively connected with each of said piston sleeves, said drive shaft, said housing, said inlet flow passages and said outlet flow passages to coordinate alternately sequenced fluid communication of said portions of said fluid flow to and from each pair of piston crowns.
19. Said method of claim 17, further comprising:
- altering the rotational relationship between said drive shaft and said housing by modifying a configuration of a circumferential raceway having radiuses and ramps.
20. Said method of claim 17, wherein:
- said pressure to said at least one piston sleeve is rotational pressure through either of said drive shaft and said housing.
21. Said method of claim 17, wherein:
- said pressure to said at least one piston sleeve is fluid pressure alternately applied to each piston crown of said pair of piston crowns.